SINGLE-FAMILY DWELLING SERVICE-ENTRANCE CALCULATIONS

1.	General	Lighting	Load	(220.12).
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Note: Included in this floor area calculation are all lighting outlets and general-use receptacles. Do not include open porches, garages, or unused or unfinished spaces not adaptable for future use. See NEC 220.12, Table 220.12, and 220.14(J).

2. Minimum Number of 15-ampere Lighting Branch Circuits.

$$\frac{\text{Line 1}}{120} = \frac{}{120} = \frac{}{120}$$
then,
$$\frac{\text{amperes}}{15} = \frac{}{15}$$
 = _____15-ampere branch circuits

3. Small-Appliance Load [210.11(C)(1), 220.52(A), and 210.52(B)].

(Minimum of two 20-ampere branch circuits)

4. Laundry Branch Circuit [210.11(C)(2), 220.52(B), and 210.52(F)].

(Minimum of one 20-ampere branch circuit)

5. Total General Lighting, Small-Appliance, and Laundry Load.

Lines
$$1 + 3 + 4$$

6. Net Calculated General Lighting, Small-Appliance, and Laundry Loads (less ranges, ovens, and "fastened-in-place" appliances). Apply demand factors from *Table 220.42*.

7. Electric Range, Wall-Mounted Ovens, Counter-Mounted Cooking Units (*Table 220.55*).

8. Electric Clothes Dryer (Table 220.51).

9. Electric Furnace (220.54).

Air Conditioner, Heat Pump (Article 440).

(Enter largest value,
$$220.60$$
) = _____ VA

10. Net Calculated General Lighting, Small-Appliance, Laundry,

Ranges, Ovens, Cooktop Units, HVAC.

Lines
$$6 + 7 + 8 + 9$$
 = _____ V.

11.	List "Fastened-in-Place"	Appliances in addition	n to Electric	Ranges,	Electric	Clothes	Dryers,	Elec-
	tric Space Heating, and A	ir-Conditioning Equi	pment.					

Appliance		,	VA Load
Water heater:		= _	VA
Dishwasher:		= _	VA
Garage door opener:		= _	VA
Food waste disposer:		= _	VA
Water pump:		= _	VA
Gas-fired furnace:		= _	VA
Sump pump:		= _	VA
Other:		= _	VA
	-	= _	VA
		= _	VA
	-	= _	VA
	Total	= _	VA

12.	Apply 75% Demand Factor (220.53) if Four or More "Fastened-in-Place" Appliances. If Less Than
	Four, Figure @ 100%. Do not include electric ranges, electric clothes dryers, electric space heating, or
	air-conditioning equipment.

Line 11 Total: _____ × 0.75

13. Total Calculated Load (Lighting, Small-Appliance, Ranges, Dryer, HVAC, "Fastened-in-Place" Appliances).

Line 10 _____ + Line 12 _____ VA

14. Add 25% of Largest Motor (220.50 and 430.24).

_____ × 0.25

Note: The largest motor can be difficult to determine because nothing is in place when service-entrance load calculations are made. It might be an air-conditioning unit or a heat pump. If the dwelling is cooled by an evaporative cooler, the largest motor might be a water pump, a large attic exhaust fan, a large food waste disposer, or a sump pump. For simplicity in this example, the water pump was chosen. The additional 25% of the largest motor is a small portion of the total service-entrance load calculation.

15. Grand Total Line 13 + Line 14.

= _____ VA

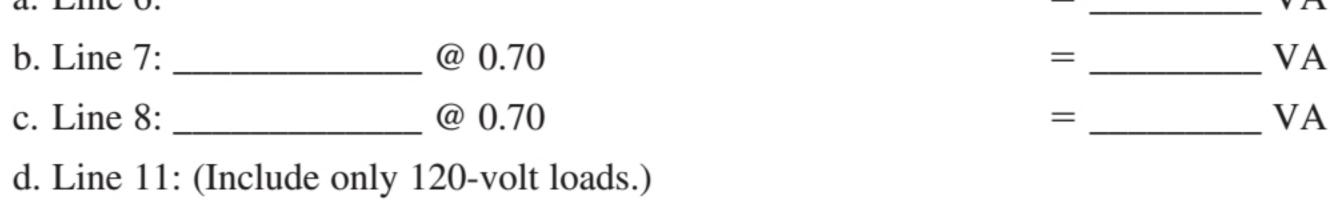
16. Minimum Ampacity for Ungrounded Service-Entrance Conductors.

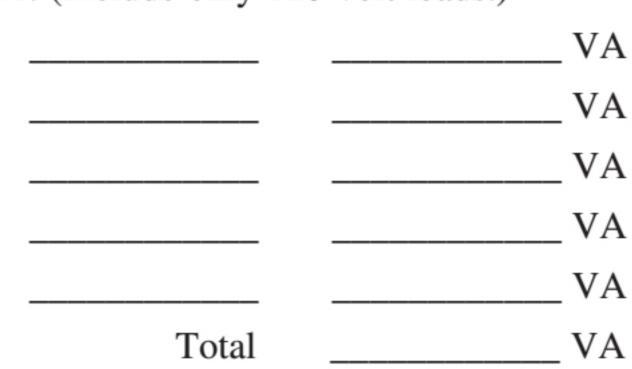
 $Amperes = \frac{Line\ 15}{240} = \underline{\hspace{1cm}} amperes$

17. Ungrounded Conductor Size (copper). _____ AWG

Note: Table 310.15(B)(7) may be used only for 120/240-volt, 3-wire, residential single-phase service-entrance conductors, service lateral conductors, and feeder conductors that serve as the main power feeder to a dwelling unit.

18. Minimum Ampacity for Neutral	Service-Entrance	Conductor,	220.61	and	310.15(E	B)(7). D	o Not
Include Straight 240-Volt Loads.							
a. Line 6:			:	=		VA	





e. Line d total @ 75% demand factor if four or more per 220.53, otherwise use 100%.

$$____$$
 × 0.75

f. Add 25% of largest 120-volt motor.

AWG

19. Neutral Conductor Size (copper)(220.61).

Note: NEC~310.15(B)(7) permits the neutral conductor to be smaller than the ungrounded "hot" conductors if the requirements of 215.2, 220.61, and 230.42 are met. NEC 220.61 states that a feeder or service neutral load shall be the maximum unbalance of the load determined by Article 220. When bare conductors are used with insulated conductors, the conductors' ampacity is based on the lowest temperature rating of the insulated conductors in the raceway, 310.15(B)(4). The neutral conductor shall not be smaller

than the grounding electrode conductor, 250.24(C)(1).

20. Grounding Electrode Conductor Size (copper) (*Table 250.66*). AWG

21. Raceway Size. Trade Size

Obtain dimensional data from *Table 1*, *Table 4*, *Table 5*, and *Table 8*, *Chapter 9*, *NEC*.